

Amendment and Response

Applicant: Steve O. Rasmussen et al.

Serial No.: 10/616,809

Filed: July 10, 2003

Docket No.: 10012978-2

Title: STARTWHEEL ACTUATION TIMING FOR PRINT MEDIA TRANSPORT SYSTEM AND METHOD

IN THE CLAIMS

Please add new claims 93-104.

Please amend claims 46, 58, 63, 65, 68, 78, 83, 86, and 91 as follows:

1-45. (Cancelled)

46. (Currently Amended) A print media transport assembly for advancing a print media through a print zone, the print media transport assembly comprising:

a primary drive roller rotatably mounted on an entry side of the print zone and adapted to contact the print media and advance the print media through the print zone;

a pinch roller rotatably mounted opposite the primary drive roller and adapted to contact the print media;

a secondary drive roller rotatably mounted on an exit side of the print zone and adapted to contact a first side of the print media; and

a starwheel rotatably mounted opposite the secondary drive roller and configured to move between a disengaged position in which the starwheel is spaced from the print media and an engaged position in which the starwheel contacts a second side of the print media,

wherein the starwheel is prevented from contact with the secondary drive roller and adapted to be moved to the engaged position after the secondary drive roller contacts the first side of the print media.

47. (Previously Presented) The print media transport assembly of claim 46, wherein the primary drive roller is adapted to contact the first side of the print media and the pinch roller is adapted to contact the second side of the print media.

48. (Previously Presented) The print media transport assembly of claim 46, wherein the print zone is defined to the second side of the print media and the printer is adapted to print on the second side of the print media.

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49. (Previously Presented) The print media transport assembly of claim 46, wherein the secondary drive roller and the starwheel are adapted to advance the print media through the print zone.

50. (Previously Presented) The print media transport assembly of claim 46, wherein the starwheel is adapted to be in the engaged position only when the secondary drive roller contacts the first side of the print media.

51. (Previously Presented) The print media transport assembly of claim 46, wherein the print media has a leading portion and a trailing portion, and wherein the starwheel is adapted to be in the disengaged position before the secondary drive roller contacts the leading portion of the print media.

52. (Previously Presented) The print media transport assembly of claim 51, wherein the starwheel is adapted to be moved to the engaged position after the secondary drive roller contacts the leading portion of the print media.

53. (Previously Presented) The print media transport assembly of claim 51, wherein the starwheel is adapted to be moved to the engaged position after the primary drive roller contacts the trailing portion of the print media.

54. (Previously Presented) The print media transport assembly of claim 51, wherein the starwheel is adapted to be in the disengaged position when the trailing portion of the print media exits the print zone.

55. (Previously Presented) The print media transport assembly of claim 51, wherein a length of the trailing portion of the print media is less than a circumference of the starwheel.

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56. (Previously Presented) The print media transport assembly of claim 46, wherein the starwheel is adapted to be moved to the engaged position when a final length of the print media to be advanced through the print zone is less than a circumference of the starwheel.

57. (Previously Presented) The print media transport assembly of claim 46, wherein the starwheel is adapted to contact the print media for less than one revolution of the starwheel.

58. (Currently Amended) A printing system for printing on a print media, the printing system comprising:

a printhead assembly adapted to eject ink drops toward a first side of the print media into a print zone between the printhead assembly and the print media to print on the print media; and

a print media transport assembly adapted to route the print media through the printing system relative to the printhead assembly, the print media transport assembly including:

a drive roller rotatably mounted on an exit side of the print zone and adapted to contact a second side of the print media, and

a starwheel rotatably mounted opposite the drive roller and configured to move between a disengaged position in which the starwheel is spaced from the print media and an engaged position in which the starwheel contacts the first side of the print media,

wherein the starwheel is prevented from contact with the drive roller and adapted to be moved to the engaged position after the drive roller contacts the first second side of the print media.

59. (Previously Presented) The printing system of claim 58, wherein the drive roller and the starwheel are adapted to advance the print media through the print zone.

60. (Previously Presented) The printing system of claim 58, wherein the starwheel is adapted to be in the engaged position only when the drive roller contacts the second side of the print media.

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61. (Previously Presented) The printing system of claim 58, wherein the print media has a leading portion and a trailing portion, and wherein the starwheel is adapted to be in the disengaged position before the drive roller contacts the leading portion of the print media.

62. (Previously Presented) The printing system of claim 61, wherein the starwheel is adapted to be moved to the engaged position after the drive roller contacts the leading portion of the print media.

63. (Currently Amended) ~~The printing system of claim 61~~ A printing system for printing on a print media having a leading portion and a trailing portion, the printing system comprising:

a printhead assembly adapted to eject ink drops toward a first side of the print media into a print zone between the printhead assembly and the print media to print on the print media; and

a print media transport assembly adapted to route the print media through the printing system relative to the printhead assembly, the print media transport assembly including:

a drive roller rotatably mounted on an exit side of the print zone and adapted to contact a second side of the print media, and

a starwheel rotatably mounted opposite the drive roller and configured to move between a disengaged position in which the starwheel is spaced from the print media and an engaged position in which the starwheel contacts the first side of the print media,

wherein the starwheel is adapted to be moved to the engaged position after the drive roller contacts the second side of the print media,

wherein the starwheel is adapted to be in the disengaged position before the drive roller contacts the leading portion of the print media, and wherein the starwheel is adapted to be in the disengaged position when the trailing portion of the print media exits the print zone.

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64. (Previously Presented) The printing system of claim 61, wherein a length of the trailing portion of the print media is less than a circumference of the starwheel.

65. (Currently Amended) ~~The printing system of claim 58~~ A printing system for printing on a print media, the printing system comprising:

a printhead assembly adapted to eject ink drops toward a first side of the print media into a print zone between the printhead assembly and the print media to print on the print media; and

a print media transport assembly adapted to route the print media through the printing system relative to the printhead assembly, the print media transport assembly including:

a drive roller rotatably mounted on an exit side of the print zone and adapted to contact a second side of the print media, and

a starwheel rotatably mounted opposite the drive roller and configured to move between a disengaged position in which the starwheel is spaced from the print media and an engaged position in which the starwheel contacts the first side of the print media,

wherein the starwheel is adapted to be moved to the engaged position after the drive roller contacts the second side of the print media, and wherein the starwheel is adapted to be moved to the disengaged position when printing is complete.

66. (Previously Presented) The printing system of claim 58, wherein the starwheel is adapted to be moved to the engaged position when a final length of the print media to be advanced through the print zone is less than a circumference of the starwheel.

67. (Previously Presented) The printing system of claim 58, wherein the starwheel is adapted to contact the print media for less than one revolution of the starwheel.

68. (Currently Amended) A method of advancing a print media through a print zone, the method comprising:

rotatably mounting a drive roller on an exit side of the print zone;

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rotatably mounting a starwheel in opposing relationship to the drive roller on the exit side of the print zone;

contacting a first side of the print media with the drive roller; and

selectively actuating the starwheel and moving the starwheel between a first position in which the starwheel is spaced from the print media and a second position in which the starwheel contacts a second side of the print media, including preventing contact between the starwheel and the drive roller, and moving the starwheel to the second position and contacting the second side of the print media with the starwheel after the drive roller contacts the first side of the print media.

69. (Previously Presented) The method of claim 68, wherein contacting the first side of the print media with the drive roller and contacting the second side of the print media with the starwheel includes advancing the print media through the print zone with the drive roller and the starwheel.

70. (Previously Presented) The method of claim 68, wherein selectively actuating the starwheel includes providing the starwheel in the first position before contacting the first side of the print media with the drive roller.

71. (Previously Presented) The method of claim 68, wherein selectively actuating the starwheel includes moving the starwheel to the second position only when the drive roller contacts the first side of the print media.

72. (Previously Presented) The method of claim 68, wherein the print media has a leading portion and a trailing portion, and wherein selectively actuating the starwheel includes moving the starwheel to the second position after the drive roller contacts the leading portion.

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73. (Previously Presented) The method of claim 72, wherein selectively actuating the starwheel includes maintaining the starwheel in the second position as the trailing portion of the print media moves through the print zone.

74. (Previously Presented) The method of claim 72, wherein selectively actuating the starwheel includes moving the starwheel to the first position when the trailing portion of the print media exits the print zone.

75. (Previously Presented) The method of claim 72, wherein a length of the trailing portion of the print media is less than a circumference of the starwheel.

76. (Previously Presented) The method of claim 68, wherein selectively actuating the starwheel includes moving the starwheel to the second position when a final length of the print media to be advanced through the print zone is less than a circumference of the starwheel.

77. (Previously Presented) The method of claim 68, wherein contacting the second side of the print media with the starwheel includes contacting the print media with the starwheel for less than one revolution of the starwheel.

78. (Currently Amended) A print media transport assembly for advancing a print media through a print zone, the print media transport assembly comprising:

a primary drive roller rotatably mounted on an entry side of the print zone and adapted to contact the print media and advance the print media through the print zone;

a pinch roller rotatably mounted opposite the primary drive roller and adapted to contact the print media;

a secondary drive roller rotatably mounted on an exit side of the print zone and adapted to contact a first side of the print media; and

a starwheel rotatably mounted opposite the secondary drive roller and adapted to selectively contact a second side of the print media,

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wherein the starwheel is prevented from contact with the secondary drive roller and
adapted to contact the print media for less than one revolution of the starwheel.

79. (Previously Presented) The print media transport assembly of claim 78, wherein the primary drive roller is adapted to contact the first side of the print media and the pinch roller is adapted to contact the second side of the print media.

80. (Previously Presented) The print media transport assembly of claim 78, wherein the print zone is defined to the second side of the print media and the printer is adapted to print on the second side of the print media.

81. (Previously Presented) The print media transport assembly of claim 78, wherein the secondary drive roller and the starwheel are adapted to advance the print media through the print zone.

82. (Previously Presented) The print media transport assembly of claim 78, wherein the starwheel is configured to move between a disengaged position in which the starwheel is spaced from the print media and an engaged position in which the starwheel contacts the second side of the print media, wherein the starwheel is adapted to be moved to the engaged position when a final length of the print media to be advanced through the print zone is less than a circumference of the starwheel.

83. (Currently Amended) A method of advancing a print media through a print zone, the method comprising:

rotatably mounting a drive roller on an exit side of the print zone;

rotatably mounting a starwheel in opposing relationship to the drive roller on the exit side of the print zone;

contacting a first side of the print media with the drive roller; and

selectively actuating the starwheel and contacting a second side of the print media with the starwheel, including preventing contact between the starwheel and the drive roller.

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and contacting the print media with the starwheel for less than one revolution of the starwheel.

84. (Previously Presented) The method of claim 83, wherein contacting the first side of the print media with the drive roller and contacting the second side of the print media with the starwheel includes advancing the print media through the print zone with the drive roller and the starwheel.

85. (Previously Presented) The method of claim 83, wherein selectively actuating the starwheel includes moving the starwheel between a first position in which the starwheel is spaced from the print media and a second position in which the starwheel contacts the print media, including moving the starwheel to the second position when a final length of the print media to be advanced through the print zone is less than a circumference of the starwheel.

86. (Currently Amended) A method of printing on a print media, the method comprising:
feeding the print media into a print zone;
printing on a first side of the print media in the print zone;
contacting a second side of the print media with a drive roller provided on an exit side of the print zone; and
selectively actuating a starwheel provided in opposing relationship to the drive roller on the exit side of the print zone, including preventing contact between the starwheel and the drive roller, and selectively contacting the first side of the print media with the starwheel based on a position of the print media during printing.

87. (Previously Presented) The method of claim 86, wherein selectively actuating the starwheel includes moving the starwheel between a first position in which the starwheel is spaced from the print media and a second position in which the starwheel contacts the print media based on the position of the print media during printing.

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88. (Previously Presented) The method of claim 87, wherein selectively actuating the starwheel includes providing the starwheel in the first position while feeding the print media into the print zone.

89. (Previously Presented) The method of claim 88, further comprising:
advancing the print media through the print zone,
wherein selectively actuating the starwheel includes moving the starwheel to the second position while advancing the print media through the print zone.

90. (Previously Presented) The method of claim 89, wherein moving the starwheel to the second position includes moving the starwheel to the second position when advancing a final length of the print media through the print zone, wherein the final length of the print media is less than a circumference of the starwheel.

91. (Currently Amended) ~~The method of claim 87~~ a method of printing on a print media, the method comprising:

feeding the print media into a print zone;

printing on a first side of the print media in the print zone;

contacting a second side of the print media with a drive roller provided on an exit side of the print zone; and

selectively actuating a starwheel provided in opposing relationship to the drive roller on the exit side of the print zone, including moving the starwheel between a first position in which the starwheel is spaced from the print media and a second position in which the starwheel contacts the first side of the print media based on a position of the print media during printing,

wherein selectively actuating the starwheel includes moving the starwheel to the first position when printing on the print media is complete.

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92. (Previously Presented) The method of claim 86, wherein selectively contacting the first side of the print media with the starwheel includes contacting the print media with the starwheel for less than one revolution of the starwheel.

93. (New) The printing system of claim 63, wherein the drive roller and the starwheel are adapted to advance the print media through the print zone.

94. (New) The printing system of claim 63, wherein the starwheel is adapted to be in the engaged position only when the drive roller contacts the second side of the print media.

95. (New) The printing system of claim 63, wherein the starwheel is adapted to be moved to the engaged position after the drive roller contacts the leading portion of the print media.

96. (New) The printing system of claim 63, wherein a length of the trailing portion of the print media is less than a circumference of the starwheel.

97. (New) The printing system of claim 63, wherein the starwheel is adapted to be moved to the disengaged position when printing is complete.

98. (New) The printing system of claim 65, wherein the drive roller and the starwheel are adapted to advance the print media through the print zone.

99. (New) The printing system of claim 65, wherein the starwheel is adapted to be in the engaged position only when the drive roller contacts the second side of the print media.

100. (New) The printing system of claim 65, wherein the starwheel is adapted to be moved to the engaged position when a final length of the print media to be advanced through the print zone is less than a circumference of the starwheel.

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101. (New) The printing system of claim 65, wherein the starwheel is adapted to contact the print media for less than one revolution of the starwheel.

102. (New) The method of claim 91, wherein selectively actuating the starwheel includes providing the starwheel in the first position while feeding the print media into the print zone.

103. (New) The method of claim 102, further comprising:
advancing the print media through the print zone,
wherein selectively actuating the starwheel includes moving the starwheel to the second position while advancing the print media through the print zone.

104. (New) The method of claim 103, wherein moving the starwheel to the second position includes moving the starwheel to the second position when advancing a final length of the print media through the print zone, wherein the final length of the print media is less than a circumference of the starwheel.